



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification: G06F	A2	(11) International Publication Number: (43) International Publication Date:	WO 00/34842 15 June 2000 (15.06.2000)
(21) International Application Number: PCT/US99/28658 (22) International Filing Date: 06 December 1999 (06.12.1999) (30) Priority Data: 09/205,824 04 December 1998 (04.12.1998) US 09/224,907 04 January 1999 (04.01.1999) US (60) Parent Application or Grant PRICELINE.COM INCORPORATED [/]; (). WALKER, Jay, S. [/]; (). CASE, T., Scott [/]; (). TEDESCO, Daniel, E. [/]; (). HANCHUK, Walter, G. ; ().		Published	

- (54) Title: METHOD AND APPARATUS FOR DETECTING AND DETERRING THE SUBMISSION OF SIMILAR OFFERS IN A COMMERCE SYSTEM
 (54) Titre: PROCEDE ET APPAREIL DE DETECTION ET DE PREVENTION DE LA SOUMISSION D'OFFRES SIMILAIRES DANS UN SYSTEME COMMERCIAL

(57) Abstract

A system and method for processing buyer offers of products, to diminish the occurrence of similar, repetitive offers whereby buyers "ping" to determine a confidential floor price for the products. In one embodiment, a first offer is received from a buyer, the first offer including a plurality of offer terms each having a respective first value. A second offer is later received from the same party, the second offer including generally the same plurality of offer terms each having a respective second value. The invention operates to determine for each of the plurality of offer terms a corresponding unacceptable similarity range, and to compare the respective first values with the respective second values for each of the offer terms. If the respective first and second values for at least of the plurality of offer terms fall within the unacceptable similarity range, a first selected process is performed on the second offer. For example, the offer may be rejected, taxed, or otherwise processed so as to discourage pinging. If the respective first and second values for the plurality of offer terms fall outside of the unacceptable similarity range, a second selected process is performed on the second offer. For example, the offer may be processed in an effort to identify a willing and able seller, in a conventional manner.

(57) Abrégé

L'invention concerne un système et un procédé de traitement d'offres d'acheteurs concernant des produits, le système permettant de réduire les cas d'offres similaires et répétées qui permettent aux acheteurs d'effectuer un sondage pour déterminer un prix minimal confidentiel pour ces produits. Dans un mode de réalisation, un acheteur soumet une première offre, cette première offre comprenant plusieurs modalités possédant chacune une première valeur respective. La même partie soumet ensuite une deuxième offre, la deuxième offre comprenant généralement la même série de modalités possédant chacune une deuxième valeur respective. L'invention permet de déterminer pour chaque série de modalités une gamme de similarité inacceptable et de comparer les premières valeurs respectives avec les deuxièmes valeurs respectives de chaque modalité. Si les premières et deuxièmes valeurs respectives d'au moins une des séries de modalités se trouve dans la gamme de similarité inacceptable, on soumet la deuxième offre à un premier traitement sélectionné. Par exemple, l'offre peut être rejetée, assujettie à l'impôt ou soumise à un autre traitement de prévention de sondage. Si les premières et deuxièmes valeurs respectives de la série de modalités ne se trouvent pas dans la gamme de similarité inacceptable, on soumet la deuxième offre à un deuxième traitement sélectionné. Par exemple, on peut traiter l'offre pour essayer d'identifier de manière classique un vendeur sérieux et habile.

PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7: G06F	A2	(11) International Publication Number: WO 00/34842
		(43) International Publication Date: 15 June 2000 (15.06.00)
(21) International Application Number: PCT/US99/28658		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TO).
(22) International Filing Date: 6 December 1999 (06.12.99)		
(30) Priority Data: 09/205,824 4 December 1998 (04.12.98) US 09/224,907 4 January 1999 (04.01.99) US		
(71) Applicant: PRICELINE.COM INCORPORATED (US/US); Five High Ridge Park, Stamford, CT 06905-1326 (US).		
(72) Inventors: WALKER, Jay, S.; 124 Spectacle Lane, Ridgefield, CT 06877 (US). CASE, T., Scott; 29 Anthony Lane, Darien, CT 06820 (US). TEDESCO, Daniel, R.; 192 Park Street, Apartment 6, New Canaan, CT 06840 (US).		
(74) Agent: HANCHUK, Walter, G.; Morgan & Finnegan, L.L.P., 345 Park Avenue, New York, NY 10154 (US).		

Published

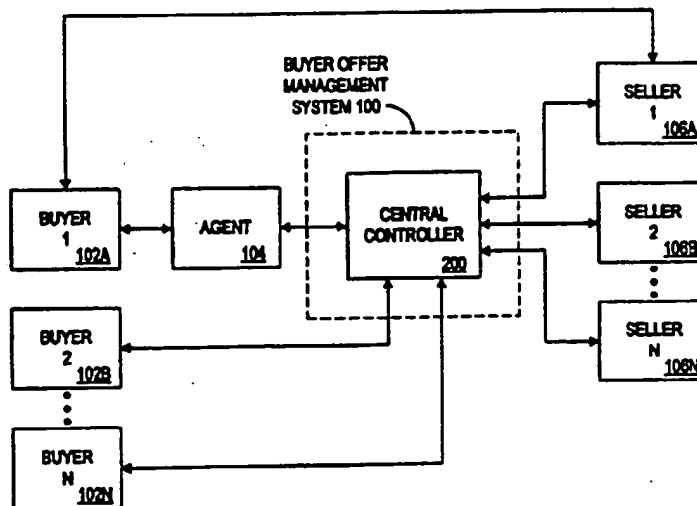
Without international search report and to be republished upon receipt of that report.

(54) Title: **METHOD AND APPARATUS FOR DETECTING AND DETERRING THE SUBMISSION OF SIMILAR OFFERS IN A COMMERCE SYSTEM**

(57) Abstract

A system and method for processing buyer offers of products, to diminish the occurrence of similar, repetitive offers whereby buyers "ping" to determine a confidential floor price for the products. In one embodiment, a first offer is received from a buyer, the first offer including a plurality of offer terms each having a respective first value. A second offer is later received from the same party, the second offer including generally the same plurality of offer terms each having a respective second value. The invention operates to determine for each of the plurality of offer terms a corresponding unacceptable similarity range, and to compare the respective first values with the respective second values for each of the offer terms. If the respective first and second values for at least of

the plurality of offer terms fall within the unacceptable similarity range, a first selected process is performed on the second offer. For example, the offer may be rejected, taxed, or otherwise processed so as to discourage ping. If the respective first and second values for the plurality of offer terms fall outside of the unacceptable similarity range, a second selected process is performed on the second offer. For example, the offer may be processed in an effort to identify a willing and able seller, in a conventional manner.



FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TC	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CV	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

Description

5

10

15

20

25

30

35

40

45

50

55

METHOD AND APPARATUS FOR DETECTING AND DETERRING THE
SUBMISSION
OF SIMILAR OFFERS IN A COMMERCE SYSTEM

The present application is a continuation-in-part of U.S. Patent Application Serial No. 09/205,824 filed December 04, 1998, which is a continuation-in-part of U.S. Patent Application Serial No. 08/943,483 filed October 03, 1997, which is a continuation-in-part of U.S. Patent Application Serial No. 08/923,683 filed September 04, 1997, which is a continuation-in-part of U.S. Patent Application Serial No. 08/889,319, filed July 8, 1997, which is a continuation-in-part of U.S. Patent Application Serial No. 08/707,660, filed September 4, 1996, now issued U.S. patent no. 5,794,207, each of which is incorporated in its entirety by reference herein.

Field of the Invention

The present invention relates generally to commerce systems, and more particularly to a commerce system that discourages buyers from submitting repetitive offers for a product to determine a selling price.

Background of the Invention

Most conventional systems for selling products are seller-driven commerce systems, wherein a seller establishes conditions, including price, for the sale of a product, and buyers determine whether or not to purchase that product. Examples of seller-driven commerce systems include conventional retail systems, both in a traditional store environment, and in an electronic environment as established on the Internet. Amazon.com, for example, is representative of a traditional seller-driven commerce system, i.e. a bookstore, that has been implemented electronically on the Internet. It is the applicant's belief that the vast majority of consumer sales are transacted using the seller-driven model.

A heretofore less common method of selling products is buyer-driven commerce, where a buyer creates an offer setting the terms and conditions of a potential purchase. The buyer offer is made available to many sellers, for example through a

5 paper or electronic 'want ad,' and interested sellers may contact the buyer to complete the transaction.

10 While much infrastructure has long been established to support seller-driven commerce, buyer-driven commerce represents a somewhat newer, lesser used
5 type of commerce having much less supporting infrastructure. Prior to the existence of electronic networks such as the Internet, and certain business models developed thereunder, applicant's believe no cost-effective infrastructure existed for supporting
15 buyer-driven commerce systems. Facilities for supporting seller-driven commerce include, for example, highly-effective advertising channels, automated payment
20 processing systems, established and readily available fulfillment systems, and other similar facilities for supporting steps of the seller-driven sales process. In contrast, many of the analogous facilities necessary to support buyer-driven commerce do not exist on the same established, economically feasible and effective scale.

25 Communications and advertising channels through which buyers may reach sellers are not, for example, as well established and effective as are the communications and advertising channels available for sellers to reach buyers.
30 Similarly, it is typically more difficult and time-consuming for a seller to contact a buyer, consummate a transaction, and collect a payment based on a buyer-driven offer, than it is for a seller to perform these same functions in a more traditional seller-driven
20 commerce environment. The development of electronic networks, as well as the invention of new commerce models and infrastructures using these networks, have moved towards making the process of buyer-driven commerce more practical and
35 economically feasible on a large-scale basis.

40 Priceline.com Incorporated of Stamford, CT is a merchant that has successfully implemented a buyer-driven commerce system for the sale of products such as airline tickets, hotel accommodations, and automobiles. Priceline.com utilizes a Conditional Purchase Offer (CPO) Management System, described in U.S. Patent No. 5,794,207 and International Application Number PCT/US97/15492, that processes
45 buyer-generated conditional purchase offers (CPOs) received from individual consumers. These CPOs contain one or more buyer-defined conditions for the purchase
30 of goods or services, at a buyer-defined price. They may be guaranteed by a general purpose account, such as a debit or credit card account, thereby providing sellers with a mechanism for collecting payments on accepted CPOs. The CPO Management System

5 operates to automatically process CPOs for potential fulfillment by a seller. Automated
processing systems developed by priceline.com make the buyer-driven commerce
system cost-effective on a large scale. The potential to receive customer offers backed
10 by credit cards, i.e. "guaranteed demand", makes the system very effective for sellers.

- 5 If a seller accepts a CPO, the CPO Management System may bind the buyer on behalf
of the accepting seller, to form a legally binding contract between the parties.

15 The CPO Management System thus empowers individual consumers to
obtain goods and services at their own specified prices. The CPO Management System
provides numerous commercial advantages to sellers as well. For example, certain
20 features of the system, including anonymity and data security, enable the seller to adjust
his price and terms to meet a consumer offer without publicly undercutting his own
retail price structure. This enables the seller to identify and accept incremental, price-
sensitive sales in a manner not typically feasible through a conventional retail process.

25 In many implementations of the above-described buyer-driven commerce
system, it is important that a seller's lowest price, or floor price, remain a secret from
the buyer. If the general buyer population discovers the seller's floor price, then there is
no incentive for any buyer to offer a reasonable price for those products. Every buyer
30 will eventually offer only the floor price, the seller's traditional retail prices and
distribution channels will be undercut, and that seller may suffer or fail in the
20 marketplace. Further, public knowledge of a seller's floor price will enable his
competitors to determine his profit margins on particular goods, providing his
competitors with an unfair advantage and an opportunity to undercut his position in the
35 market.

40 One problem foreseen by the inventors is the likelihood that buyers
(including competitors) may attempt to determine a seller's lowest price is to 'ping' the
system by submitting repetitive offers to the system with incrementally increasing
prices. For example, if a buyer believes a seller's floor price to be in the range of ten to
45 fifteen dollars for a particular product, he may submit a first offer at nine dollars. If that
offer is rejected, he would then submit subsequent offers, increasing the offer price
30 incrementally (for example by one dollar), until an offer is accepted. At that time, the
buyer knows the seller's lowest price, and may communicate that price to competitors
and to other potential buyers.

5 The present inventors have thus determined that, in order for at least
some methods of buyer-driven commerce to operate successfully, it is necessary to
develop methods and systems for preventing buyers from determining lowest available
10 seller prices. It is particularly desirable to prevent buyers from ping the system to
5 make such a determination.

15 Summary of the Invention

 A principle object of the present invention is to provide a system and
method whereby buyer users of a buyer-driven commerce system are effectively
10 discouraged from submitting repetitive offers in an effort to determine a lowest seller
20 price for a particular product.

 In accordance with a first embodiment of the present invention, there is
provided a system and method of processing offers for the purchase of products, the
method comprising the steps of: receiving from a party at least first and second offers
25 for a product; comparing the first and second offers; and if the first and second offers
15 fall within a predetermined range of similarity, then performing a first selected process
on at least one of the first and second offers.

 In accordance with another aspect of the invention, there is provided a
30 system and method of processing offers for the purchase of products, the method
20 comprising the steps of: receiving from a party a first offer, the first offer including a
plurality of offer terms each having a respective first value; receiving from the party a
35 second offer, the second offer including the plurality of offer terms each having a
respective second value; determining for each of the plurality of offer terms a
corresponding unacceptable similarity range; comparing the respective first values with
25 the respective second values for each of the offer terms; and performing, if the
40 respective first and second values for at least one of the plurality of offer terms fall
within the unacceptable similarity range, a first selected process on the second offer.

 In accordance with yet another embodiment of practicing the invention,
45 there is provided a system and method of processing offers for the purchase of products,
30 the method comprising the steps of: receiving from a party a first conditional purchase
offer, the first conditional purchase offer including a plurality of offer terms each having
a respective first value; receiving from the party a second conditional purchase offer, the
50 second conditional purchase offer including the plurality of offer terms each having a

5 respective second value; the plurality of offer terms including a condition, a purchase
price, a payment identifier, and an authorization to use the payment identifier to pay the
10 purchase price; determining for each of the plurality of offer terms an unacceptable
similarity range; comparing the respective first values with the respective second values
5 for each of the offer terms; if the respective first and second values for at least one of the
plurality of offer terms fall within the unacceptable similarity range, performing a first
15 process on the second offer; and if the respective first and second values for the plurality
of offer terms do not fall within the unacceptable similarity range, performing a second
process on the second offer.

10

Brief Description of the Drawing Figures

20 These, and other objects, features and advantages of the invention will
become apparent from a consideration of the detailed description below, in which:

Fig. 1 is a block diagram of a CPO Management System in accordance with the
25 invention;

Fig. 2 is a block diagram of the central controller of Fig. 1;

Fig. 3 is a table showing the data contents of an exemplary seller database;

Fig. 4 is a table showing the data contents of an exemplary buyer database;

Fig. 5 is a table showing the data contents of an exemplary buyer offer

20 database;

Fig. 6A is a table showing the data contents of an exemplary offer similarity
35 range database;

Fig. 6B is a table showing the data contents of an exemplary unacceptable
similarity rules database;

25 Figs. 7A&B together show a flow chart showing an exemplary rules evaluation
process; and

Fig. 8 is a flow chart showing an exemplary CPO evaluation process.

Detailed Description of the Invention

30 The present invention has application in the field of buyer-driven
commerce, used herein to described methods of commerce wherein buyers assemble and
submit offers to sellers, the sellers having the opportunity to consider and fill the offer.
50 Fulfillment typically occurs after discussions with the buyer, during which payment

5 mechanisms and fulfillment terms (i.e. delivery) are agreed to. One traditional method of buyer-driven commerce is the 'want ad,' which may be implemented today both electronically and in paper publications.

10 The present invention is operative to discourage buyer efforts to
5 determine confidential price floors set by sellers. The invention is particularly effective in discouraging "pinging," used herein to describe a method whereby users of a system repetitively interact with that system in order to determine confidential information relating to the system. Such interactions can be on a large-scale basis, for example in the millions of interactions, in attempts to determine cryptographic protocols. The
15 present invention is particularly concerned with the submission of repetitive buyer
20 offers to a buyer-driven commerce system in order to attempt to determine a confidential price floor of a seller.

An important subset of buyer-driven commerce is the priceline.com
25 model using conditional purchase offers (CPOs). A conditional purchase offer is a
15 buyer offer that contains at the least a buyer-specified condition for the purchase of a product, and a buyer-specified price. A conditional purchase order desirably has some financial obligation on the part of the buyer associated with it, for example a penalty for failure to execute on an offer accepted by a seller. A conditional purchase offer may
30 also be binding, wherein a buyer at the time of offer commits to pay his offer price if a
20 seller accepts the offer. Binding CPOs are typically guaranteed with a financial account identifier, for example a credit or debit card account number. The inclusion of a
35 payment guarantee raises the buyer offer, or demand unit, to the level of "guaranteed demand," making the offer less risky and hence more cost-effective for a seller to consider.

25 Other features that are applicable to the CPO model include the provision
40 of anonymity to a seller, and the provision of flexible terms and conditions in the buyer's CPO. By making the seller's identity anonymous, at least until the seller accepts an offer, sellers may participate in the system with a much diminished concern
45 about undercutting their own retail structure. By requiring the buyer offer to include
30 flexible terms, terms that may be specified by the seller (i.e. delivery date, quality, brand name, etc...), the seller is again given the ability to fill the offer with lessened concern
50 about undercutting their own retail structure.

5

10

15

Referring now to Fig. 1, there is shown a buyer offer management system 100 including a central controller 200 for communicating buyer offers and buyer offer-related information with a plurality of buyers 102A-102N, and communicating buyer offer and seller acceptance-related information with a plurality of sellers 106A-106N. Buyer offers and related information may be communicated by any appropriate means, for example, through an electronic network, by telephone, or by mail. Buyer offers may be received directly from a buyer, or through an agent 104 on behalf of a buyer, the agent shown herein as operating with buyer 102A.

20

25

30

In the described embodiment, buyers communicate with central controller 200 electronically via the Internet, and the central controller in turn communicates with sellers through an appropriate electronic data interface. Buyers 102A-102N would thus communicate with central controller 200 using an appropriate electronic terminal, for example a personal computer. Sellers 106A-106N likewise communicate with the central controller 200 through an appropriate computer, for example a personal computer, a server, or a main-frame computer. As will be discussed further below, selected sellers receive buyer offers directly from central controller 200, while other sellers provide agency-based rules for use by the central controller to itself evaluate buyer offers on behalf of such sellers.

35

40

With reference now to Fig. 2, central controller 200 is seen to comprise a generally conventional computer, including a central processing unit (CPU) 202 connected to random access memory 204, read-only memory 206, and a clock 208. CPU 202 is further connected to a communications port 210, such as a modem or a network interface, and a storage device 212. Storage device 212 can comprise, for example, a conventional combination of magnetic, optical, and/or semiconductor memory.

45

50

In accordance with the present invention, storage device 212 is seen to include a seller database 300, a buyer database 400, an offer database 500, an offer term database 600, and an unacceptable similarity rules database 650, each of which is described in further detail below. Storage device 212 further includes software instructions for performing a rules evaluation process 700 and an offer evaluation process 800, each of which are also described in further detail below. Central controller 200 further includes those standard hardware and software components necessary to the operation of a computer, as are well known to those of ordinary skill in the art.

55

5 Referring now to Fig. 3, seller database 300 is seen to include four data
records, indicated at 300A-300D. Each data record includes four data fields: a seller
10 identifier field 302 containing an identifier assigned by central controller 200, a seller
name field 304 including an alpha-numeric seller name, a seller contact information
5 field 306 indicating an address or other method of communicating information with a
seller, and a seller agent status field 308 indicating whether the seller has provided rules
for local evaluation of a buyer offer by the central controller. Examining, for example,
15 record 300A, Airline 1 is seen to be associated with identifier 1231 and to have an
electronic contact address of 'E-ADDRESS#1'. The seller agent status is "no,"
20 indicating the seller has not provided rules for local evaluation of buyer offers, and is
thus to have direct access to buyer offers in the manner described below. In contrast,
Airline 2 as identified in data record 300B is seen to have provided buyer offer
evaluation rules, which are available for use at a local database address "DBASE-
ADDRESS#2." Though not shown, an external contact address or information may also
25 be provided for Airline 2.

With reference now to Fig. 4, there is shown buyer database 400
including two data records 402A, 402B, each including four fields: a buyer identifier
30 field 404 including an identifier either generated by central controller 200 or provided
by a buyer (e.g. a social security number), a financial account identifier field 406
20 including a financial account identifier such as a credit or debit card number provided
by the buyer, a buyer name field 408, and a contact information field 410 including
35 buyer contact information. Examining, for example, record 402A, buyer Joe Smith is
seen to have been assigned identifier 4567, to have provided credit card number 1111-
1111-1111-1111 as a financial account identifier, and to have an electronic mail address
25 of smith@isp.com.

40 Referring now to Fig. 5, buyer offer database 500 is seen to include three
data records 502A-502C. Each record is seen to include six data fields: a buyer offer
identifier field 504 generated by central controller 200, a buyer identifier field 506
45 which corresponds to the buyer identifier in buyer database 400, a buyer offer
conditions field 508 including conditions specified by the buyer, a price field 510
30 including a buyer-specified price, a submission date/time field 512 including the
submission date of the buyer offer, and an expiration date/time field 514 including any
50 buyer offer expiration date assigned by central controller 200 or by the buyer.

5 Examining, for example, data record 502A, buyer offer "1" is seen to correspond to
buyer "4567." The conditions are for an airline ticket: round-trip from New York to Los
10 Angeles, leaving on "1/15/98" and returning on "1/19/98." The buyer-specified offer
price is "\$200," the date of submission of the buyer offer is "1/1/98," and the expiration
5 date is "1/14/98." It is to be noted that data record 502B includes a second offer by the
same buyer, this second offer having a changed departure date, price, and expiration
15 date.

With reference now to Fig. 6A, offer term database 600 stores
unacceptable similarity ranges for selected offer terms, and is seen to include five
10 records 602A-602E, each including three fields: an identifier field 603 constituting an
index assigned by the system, a buyer offer characteristic field 604 including data
20 identifying a buyer offer term, and a term similarity range field 606 containing a range
for the corresponding term within which similar buyer offers may, in accordance with
the rules described below, be rejected or differently processed. Examining, for example,
25 data record 602A, it is seen that identifier "001" indexes buyer offer dates (field 604)
submitted within two days of one-another (field 606).

Referring now to Fig. 6B, unacceptable similarity rules database 650
30 identifies selected combinations of term similarity ranges from database 600 which
together are used to identify types of buyer offers which are to be rejected or otherwise
20 differently processed. Database 650 is seen to include four records, 652A-D, each
including two fields: a rule identifier field 654 constituting a rule number assigned by
35 the system, and a term similarity range identifiers field 656 identifying, in Boolean logic
format, what combination of term similarity ranges from field 606 of database 600
comprise an unacceptable buyer offer. That is, term similarity range identifiers 656 are
25 used, in accordance with the processes set out and described below, to identify those
40 buyer offers which are similar in nature and thus are likely to be operative to ping the
system to identify price floors, so that such similar offers can be rejected or otherwise
separately processed.

45 Examining in detail the rules set out in database 650, the rules identified
30 in record 652A for identifier 001 are seen to identify a Boolean combination of terms
from database 600. More specifically, the similarity range identifiers in this first rule
are seen to identify the following combination of fields: 602C (and) 602B (and) 602E as
50 constituting an unacceptable offer. Considering the corresponding term similarity range

information from database 600, rule "001" is seen to identify offers that have: identical buyer identifiers (and) offers within \$50.00 of one-another, (and) the same city pair.

The remaining rules from database 650 are similarly examined in Table 1 below.

Unacceptable Rule Identifier	Term Similarity Range Identifiers
002	identical payment identifiers (and) prices within \$50.00 (and) same city
003	(identical buyer identifiers (or) identical payment identifiers) (and) (same city pairs (and) offers received within two days of one-another)
004	(identical buyer identifiers (or) identical payment identifiers) (and) (offer prices within \$50.00 (and) same city pairs)

TABLE 1

For purposes of illustration and explanation, other combinations of offer terms that may identify system pings include, without limitation, two offers that are unacceptably similar in the range of: 1) dates and offer prices, 2) for an airline ticket, dates and itineraries, 3) for consumer products, offer prices and product specifications, 4) for consumer products, offer prices and brand specifications, 5) for hotel room accommodations, dates and locations, 6) for hotel room accommodations, locations and offer prices, 7) for financial products, financial terms and offer prices, 8) for airline tickets, date, itinerary and offer price, 9) for hotels, date, location, and offer price, 10) for hotels, date, location, offer price, and hotel rating, etc. It will be apparent to those skilled in the art that many different combinations of terms may be identified which would indicate that two related offers are functional to determine a confidential price floor, and upon the occurrence of unacceptably similar ranges for those terms, the second offer should be processed by an alternative process.

Referring now to Fig. 7A, a process 700 for utilizing the similarity rules in database 650 to determine how to process a buyer offer is shown, the first step 702 comprising receiving a buyer offer for processing. As described with respect to Fig 1, in the present embodiment, the buyer offer is received into central controller 200 through an Internet communication. The buyer offer may include, for example, product specifications, fulfillment terms and conditions, and/or an offer price. It will be understood that the content of the buyer offer is particularly relevant to the present

5 invention in its relation to previously submitted offers, more so than to the absolute
contents of a particular offer. It will be further understood that, in the described
embodiment, it is a rule requirement that compared offers are by the same buyer. As
10 described above, this same buyer requirement is not necessary to all applications of the
5 present invention.

The information contained in the received buyer offer is used to create a
15 buyer record in buyer database 400 (step 704) and an offer record in offer database 500
(step 706). A search is then made of the buyer and offer databases to determine if a
previous offer has been received from the same buyer (step 708).

20 It will be understood that one purpose of the present invention is to
prevent ping by a buyer(s) to determine a seller price floor. Accordingly, the terms
"buyer," and/or "party," and/or equivalents, when used to refer to an entity capable of
pinging the system to determine pricing information, may be identified in many
25 different ways, including: the same (or a recognizably similar variation of) a: name,
15 address, financial account identifier, telephone number, and/or geographic location (as
may be determined, for example, by a global positioning system, telephone number, zip
code, or the like). Other criteria for determining the existence of the "same" buyer may
30 include the existence of a central controller-placed 'cookie' on a buyer's computer, and
in appropriate circumstances similar offer terms and conditions such as product
20 amenities, dates of offers, and/or price. Again, it will be understood that for the purpose
of the present invention, a "buyer" is an entity who might repetitively ping central
35 controller 200 to determine a floor price.

Many other criteria will be apparent to those skilled in the art by which
such a buyer may be identified. It will be seen that, for purposes of illustration and
40 25 explanation, two "same buyer" identifiers are set out in database 600: the same buyer
identifier in field 602C, which may comprise, for example, the same buyer name or
same buyer account identifier, and the same payment identifier as set out in field 602D,
for example the same credit card account number.

45 If no previous offer has been received from the same buyer (step 710),
30 the buyer offer is processed conventionally according to the steps set out in Fig. 8,
described below (step 712).

50 If a previous offer has been received from the same buyer (step 710),
then the rules in the similarity rules database are used to determine if the newly received

5 offer is unacceptably similar in scope to the previous offer. This process is initiated by comparing the terms of the newly received offer to the terms of the previously received offer (step 714).

10 With reference now to Fig. 7B, for each offer, the difference between the
5 current offer terms (excepting the buyer identifiers, which have been compared above) and the previous offer terms is determined (step 716). For purposes of explanation, if the terms being compared are price, the monetary difference between the prices of the
15 current and previous offers are calculated. If the terms being compared are the buyer-requested date of service, the length of time between term dates is calculated. If product
20 brands are specified, the product brand terms may be compared to determine if the specified brand has been altered. Appropriate difference ranges are determined for all selected offer terms, which may further include: offer dates, product specifications, fulfillment terms and conditions, specifications of selected sellers, etc.

25 For each buyer offer, the term similarity range identifiers, in Boolean
15 form, are retrieved from field 656 of database 650, and used to retrieve the corresponding term similarity range data from field 606 of database 600 (step 718). This retrieved range data is used to construct the unacceptable similarity rule for the
30 particular offer (step 719). It will be understood that different unacceptable similarity rules may be used for different business circumstances, depending on the particular rule identifier selected to index a record in database 650. Such decisions are to be
20 determined by the system operator, and may be based on, for example, types of products being sold and/or business goals of the system operator and/or sellers. The actual
35 difference between the current and previous offer terms are then compared to the unacceptable similarity rule data (step 720). If the actual offer term difference is outside
25 of the unacceptable similarity rule range (step 722), i.e. the current offer is acceptable and not identified as a ping, then the current buyer offer is processed conventionally
40 (step 726).

45 If the buyer offer test at step 722 is determined as having an unacceptable
similarity to a previous offer, i.e. the offer term differences fall within the unacceptable
30 similarity rule, then an alternate process is selected for the current buyer offer (step 728). In the described embodiment, the alternate process is to reject the current offer, thereby preventing pinging. It will be understood that other alternate processes may be
50 selected which will also prevent or discourage pinging, such as: charging a surcharge to

5 process the current offer, providing a warning to the buyer that this is the last similar
offer that will be processed, and/or suspending future privileges of the buyer to use the
system. Many other methods of processing such an offer while discouraging and
10 preventing ping-pong will now be apparent to those of ordinary skill in the art.

5 With reference now to Fig. 8, a conventional process is shown for
processing buyer offers that do not include unacceptably similar terms as determined by
the similarity rules process 700 described above. To initiate process 800, a buyer offer
15 is identified for conventional processing (step 802). That buyer offer is made available
to remote sellers (also termed 'broadcast-based' sellers) (step 804) and compared to
20 rules provided by rules-based sellers (also termed 'agency-based' sellers) (step 806).
The step of making such an offer available to remote sellers may include, for example,
transmitting the offer to the remote sellers electronically or by paper, and/or making the
offer available for viewing by remote sellers, such as on an Internet website. The step
25 of comparing such an offer to rules includes comparing the terms of the offer to rules of
15 acceptance provided by a seller(s) for local processing and acceptance. Such rules, for
example, may be collected and stored in a database in central controller 200.

30 It is next determined if any seller accepts the buyer offer (step 808). If
neither of steps 804 or 806 identify an accepting seller, then the buyer is notified with a
rejection of the offer (step 810). If an acceptance by a seller is identified in step 808,
20 then the accepting seller is identified (step 812) and provided with the necessary buyer
data (step 814). The buyer is likewise notified (step 816) of the acceptance, and
35 provided necessary information relating to the seller.

There has thus been provided a new and improved method and system
for processing buyer offers in a commerce system, and particularly in a buyer-driven
25 commerce system, which discourages and/or prevents buyer ping-pong (i.e. the submission
of multiple similar offers) to determine a seller floor price. The invention has
application in buyer-driven commerce systems, and particularly in systems such as those
provided by priceline.com. The invention is flexible enough to detect many different
45 types of potential ping-pong strategies, and can be implemented so that it does not require
undue resources.
30

While the present invention has been shown and described with respect
to specific embodiments, it is not thus limited. Numerous modifications, changes and
50

5

improvements falling within the scope of the invention will occur to those skilled in the art.

10

15

20

25

30

35

40

45

50

55

Claims

5

10

15

20

25

30

35

40

45

50

55

5

What is claimed is:

10

1. A method of processing offers for the purchase of products, comprising the steps of:

5

receiving from a party at least first and second offers for a product;
comparing said first and second offers; and

15

if said first and second offers fall within a predetermined range of similarity, then performing a first selected process on at least one of said first and second offers.

10

20

2. A method in accordance with claim 1 and further including the step of, if said first and second offers do not fall within a predetermined range of similarity, then performing a second selected process on at least one of said first and second offers.

25

15

3. A method in accordance with claim 1 and further including the steps of:
storing a plurality of similarity rules, each similarity rule containing information relating to a particular term of said first and second offers; and
said comparing step including retrieving and using at least one of said plurality of similarity rules to compare said first and second offers.

30

20

35

4. A system for processing offers for the purchase of products, comprising:
means for receiving from a party at least first and second offers for a product;

40

25

means for comparing said first and second offers; and
means, if said first and second offers fall within a predetermined range of similarity, for performing a first selected process on at least one of said first and second offers.

45

30

5. A system in accordance with claim 4 and further including means, if said first and second offers do not fall within a predetermined range of similarity, for performing a second selected process on at least one of said first and second offers.

50

6. A system in accordance with claim 4 and further including:

55

5 means for storing a plurality of similarity rules, each similarity rule
containing information relating to a particular term of said first and second offers; and
said comparing means including means for retrieving and using at least
10 one of said plurality of similarity rules to compare said first and second offers.

5

7. A system for processing offers for the purchase of products, comprising:
a processor;

15

a memory connected to said processor and storing instructions for
controlling said processor, said processor operative with said instructions to
20 receive from a party at least first and second offers for a product;
compare said first and second offers; and
if said first and second offers fall within a predetermined range of
similarity, then perform a first selected process on at least one of said first and second
offers.

25

15

8. A system in accordance with claim 7 said processor further operative, if
said first and second offers do not fall within a predetermined range of similarity, to
perform a second selected process on at least one of said first and second offers.

30

20 9.

A system in accordance with claim 7 wherein:

said memory further stores a plurality of similarity rules, each similarity
rule containing information relating to a particular term of said first and second offers;
and

35

said processor further operative to retrieve and use at least one of said
25 plurality of similarity rules to compare said first and second offers.

40

10. A computer readable medium storing instructions for controlling a
computer to process offers for the purchase of products, comprising:

45

a program instruction for receiving from a party at least first and second
30 offers for a product;

a program instruction for comparing said first and second offers; and

50

55

5 a program instruction for performing a first selected process on at least
one of said first and second offers if said first and second offers fall within a
predetermined range of similarity.

- 10 11. A method of processing offers for the purchase of products, comprising
the steps of:
- 15 receiving from a party a first offer, said first offer including a plurality of
offer terms each having a respective first value;
receiving from said party a second offer, said second offer including said
10 plurality of offer terms each having a respective second value;
20 determining for each of said plurality of offer terms a corresponding
unacceptable similarity range;
comparing said respective first values with said respective second values
for each of said offer terms; and
25 15 performing, if said respective first and second values for at least one of
said plurality of offer terms fall within said unacceptable similarity range, a first
selected process on said second offer.

- 30 12. A method in accordance with claim 11, and further including the step of,
20 if said respective first and second values for said plurality of offer terms fall outside of
said unacceptable similarity range, performing a second selected process on said second
35 offer.

- 40 13. A method in accordance with claim 12, said determining step including
25 the step of retrieving a stored similarity rule containing an offer term identifier and an
unacceptable similarity range corresponding to said offer term identifier.

- 45 14. A method in accordance with claim 13 wherein said comparing step
includes comparing the respective differences between said first values and said second
30 values of said offer terms to said unacceptable similarity ranges of said similarity rules.

- 50 15. A method in accordance with claim 11 wherein said party is identified by
at least one characteristic selected from the group comprising a name, a telephone

5 number, a financial account number, a geographic location, an address, and an electronic mail address.

10 16. A method in accordance with claim 11 wherein said performing step is
5 conditional upon, said respective first and second values for at least two of said plurality of offer terms falling within said unacceptable similarity range.

15 17. A method in accordance with claim 16 wherein said plurality of offer
terms are selected from the group comprising price, date, quantity, quality, brand, and
10 product specifications.

20 18. A system for processing offers for the purchase of products, comprising:
a processor;
a memory connected to said processor and storing instructions for
25 15 controlling said processor, said processor operative with said instructions to
receive from a party a first offer, said first offer including a
plurality of offer terms each having a respective first value;
receive from said party a second offer, said second offer
30 including said plurality of offer terms each having a respective second value;
determine for each of said plurality of offer terms a
20 corresponding unacceptable similarity range;
compare said respective first values with said respective second
35 values for each of said offer terms; and
perform, if said respective first and second values for at least one
25 of said plurality of offer terms fall within said unacceptable similarity range, a
first selected process on said second offer.
40

45 19. A system in accordance with claim 18, said processor further operative,
if said respective first and second values for said plurality of offer terms fall outside of
30 said unacceptable similarity range, to perform a second selected process on said second
offer.
50

5 20. A system in accordance with claim 19, said processor further operative in
said determining step to retrieve a stored similarity rule containing an offer term
10 identifier and an unacceptable similarity range corresponding to said offer term
identifier.

5 21. A system in accordance with claim 20 wherein said processor is further
operative in said comparing step to compare the respective differences between said first
15 values and said second values of said offer terms to said unacceptable similarity ranges
of said similarity rules.

10 22. A system in accordance with claim 18 wherein said party is identified by
at least one characteristic selected from the group comprising a name, a telephone
20 number, a financial account number, a geographic location, an address, and an
electronic mail address.

25 23. A system in accordance with claim 18 wherein said performing operation
is conditional upon said respective first and second values for at least two of said
30 plurality of offer terms falling within said unacceptable similarity range.

20 24. A system in accordance with claim 23 wherein said plurality of offer
terms are selected from the group comprising price, date, quantity, quality, brand, and
35 product specifications.

25 25. A system for processing offers for the purchase of products, comprising:
means for receiving from a party a first offer, said first offer including a
40 plurality of offer terms each having a respective first value;
means for receiving from said party a second offer, said second offer
including said plurality of offer terms each having a respective second value;
45 means for determining for each of said plurality of offer terms a
30 corresponding unacceptable similarity range;
means for comparing said respective first values with said respective
50 second values for each of said offer terms; and

5 means for performing, if said respective first and second values for at least one of said plurality of offer terms fall within said unacceptable similarity range, a first selected process on said second offer.

- 10
- 5 26. A computer readable medium storing instructions for controlling a computer to process offers for the purchase of products, comprising:
- 15 a program instruction for receiving from a party a first offer, said first offer including a plurality of offer terms each having a respective first value;
- 20 20 a program instruction for receiving from said party a second offer, said second offer including said plurality of offer terms each having a respective second value;
- 25 a program instruction for determining for each of said plurality of offer terms a corresponding unacceptable similarity range;
- 25 15 a program instruction for comparing said respective first values with said respective second values for each of said offer terms; and
- 30 a program instruction for performing, if said respective first and second values for at least one of said plurality of offer terms fall within said unacceptable similarity range, a first selected process on said second offer.

- 20
- 35 27. A method of processing offers for the purchase of products, comprising the steps of:
- 40 25 receiving from a party a first conditional purchase offer, said first conditional purchase offer including a plurality of offer terms each having a respective first value;
- 45 receiving from said party a second conditional purchase offer, said second conditional purchase offer including said plurality of offer terms each having a respective second value;
- 50 30 said plurality of offer terms including a condition, a purchase price, a payment identifier, and an authorization to use said payment identifier to pay said purchase price;
- 55 determining for each of said plurality of offer terms an unacceptable similarity range;

5

comparing said respective first values with said respective second values for each of said offer terms;

10

if said respective first and second values for at least one of said plurality of offer terms fall within said unacceptable similarity range, performing a first process on said second offer; and

15

if said respective first and second values for said plurality of offer terms do not fall within said unacceptable similarity range, performing a second process on said second offer.

20

28. The method of claim 27 wherein said step of performing a second process comprises transmitting said second offer to a plurality of sellers.

25

29. The method of claim 27 wherein said step of performing a second process comprises querying a database to determine seller information.

30

30. The method of claim 27 wherein said step of performing a first process comprises rejecting said second offer.

35

31. The method of claim 27 wherein said step of performing a first process comprises using said payment identifier to charge said party a fee for processing said second offer.

40

32. A method in accordance with claim 27, said determining step including the step of retrieving a stored similarity rule containing an offer term identifier and an unacceptable similarity range corresponding to said offer term identifier.

45

33. A method in accordance with claim 32 wherein said comparing step includes comparing the respective differences between said first and second values of said offer terms to said unacceptable similarity ranges of said similarity rules.

50

34. A method in accordance with claim 27 wherein said party is identified by at least one characteristic selected from the group comprising a name, a telephone

55

5 number, a financial account number, a geographic location, an address, and an electronic mail address.

10 35. A method in accordance with claim 27 wherein said step of performing a
5 first process is conditional upon said respective first and second values for at least two of said plurality of offer terms falling within said unacceptable similarity range.

15 36. A method in accordance with claim 35 wherein said plurality of offer terms are selected from the group comprising price, date, quantity, quality, brand, and
10 product specifications.

20 37. A system for processing offers for the purchase of products, comprising:
a processor;
a memory connected to said processor and storing instructions for
25 15 controlling said processor, said processor operative with said instructions to
receive from a party a first conditional purchase offer, said first
conditional purchase offer including a plurality of offer terms each having a
30 respective first value;
receive from said party a second conditional purchase offer, said
20 second conditional purchase offer including said plurality of offer terms each
having a respective second value;
35 said plurality of offer terms including a condition, a purchase
price, a payment identifier, and an authorization to use said payment identifier to
pay said purchase price;
25 determine for each of said plurality of offer terms an
40 unacceptable similarity range;
compare said respective first values with said respective second
values for each of said offer terms;
45 if said respective first and second values for at least one of said
30 plurality of offer terms fall within said unacceptable similarity range, perform a
first process on said second offer; and

5

if said respective first and second values for said plurality of offer terms do not fall within said unacceptable similarity range, perform a second process on said second offer.

10

5 38. The system of claim 37 wherein said operation of performing a second process comprises transmitting said second offer to a plurality of sellers.

15

39. The system of claim 38 wherein said operation of performing a second process comprises querying a database to determine seller information.

10

20

40. The system of claim 37 wherein said operation of performing a first process comprises rejecting said second offer.

25

15 41. The system of claim 37 wherein said operation of performing a first process comprises using said payment identifier to charge said party a fee for processing said second offer.

30

42. A system in accordance with claim 37, said determining operation including the operation of retrieving a stored similarity rule containing an offer term identifier and an unacceptable similarity range corresponding to said offer term identifier.

35

43. A system in accordance with claim 42 wherein said comparing operation includes comparing the respective differences between said first and second values of said offer terms to said unacceptable similarity ranges of said similarity rules.

40

44. A system in accordance with claim 37 wherein said party is identified by at least one characteristic selected from the group comprising a name, a telephone number, a financial account number, a geographic location, an address, and an electronic mail address.

45

30

50

45. A system in accordance with claim 37 wherein said operation of performing a first process is conditional upon said respective first and second values for

55

5 at least two of said plurality of offer terms falling within said unacceptable similarity range.

10 46. A system in accordance with claim 45 wherein said plurality of offer
5 terms are selected from the group comprising price, date, quantity, quality, brand, and product specifications.

15 47. A system for processing offers for the purchase of products, comprising:
means for receiving from a party a first conditional purchase offer, said
10 first conditional purchase offer including a plurality of offer terms each having a
20 respective first value;

means for receiving from said party a second conditional purchase offer,
said second conditional purchase offer including said plurality of offer terms each
having a respective second value;

25 15 said plurality of offer terms including a condition, a purchase price, a
payment identifier, and an authorization to use said payment identifier to pay said
purchase price;

30 means for determining, for each of said plurality of offer terms, an
unacceptable similarity range;

20 means for comparing said respective first values with said respective
second values for each of said offer terms;

35 means for, if said respective first and second values for at least one of
said plurality of offer terms fall within said unacceptable similarity range, performing a
first process on said second offer; and

25 40 means for, if said respective first and second values for said plurality of
offer terms do not fall within said unacceptable similarity range, performing a second
process on said second offer.

45 48. A computer readable medium storing instructions for controlling a
30 computer to process offers for the purchase of products, comprising:

a program instruction for receiving from a party a first conditional
purchase offer, said first conditional purchase offer including a plurality of offer terms
50 each having a respective first value;

5

a program instruction for receiving from said party a second conditional purchase offer, said second conditional purchase offer including said plurality of offer terms each having a respective second value;

10

said plurality of offer terms including a condition, a purchase price, a payment identifier, and an authorization to use said payment identifier to pay said purchase price;

15

a program instruction for determining for each of said plurality of offer terms an unacceptable similarity range;

a program instruction for comparing said respective first values with said respective second values for each of said offer terms;

20

a program instruction for, if said respective first and second values for at least one of said plurality of offer terms fall within said unacceptable similarity range, performing a first process on said second offer; and

25

a program instruction for, if said respective first and second values for said plurality of offer terms do not fall within said unacceptable similarity range, performing a second process on said second offer.

30

35

40

45

50

55

1/10

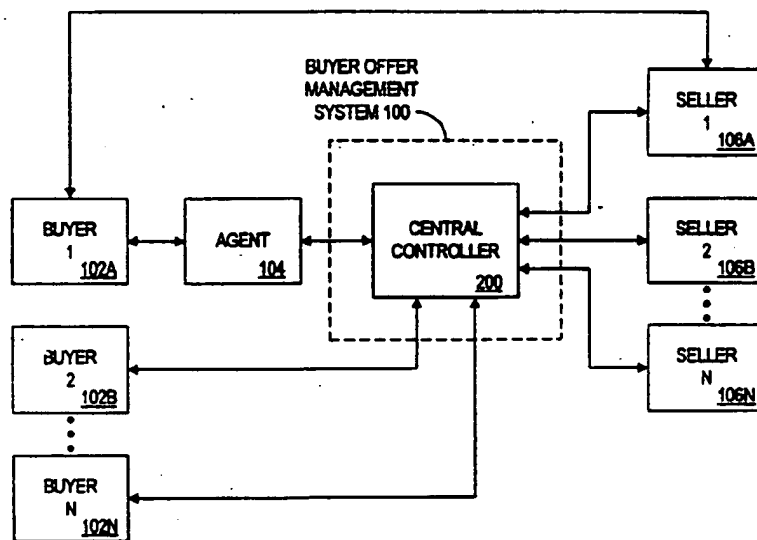


FIG. 1

2/10

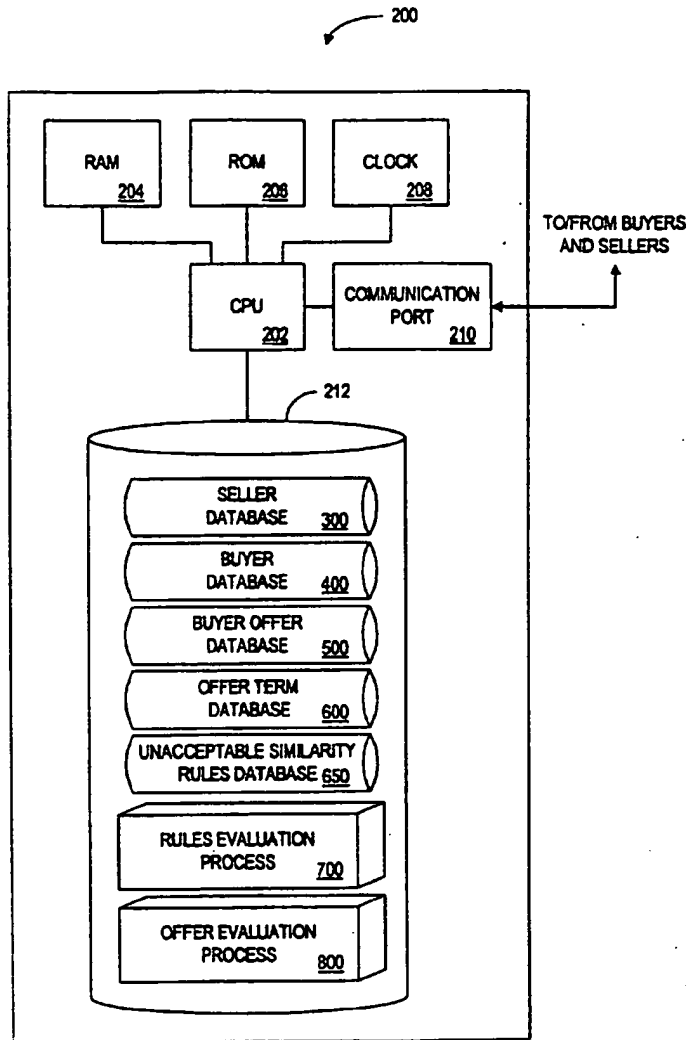


FIG. 2

300

SELLER IDENTIFIER 302	SELLER NAME 304	SELLER CONTACT INFORMATION 308	SELLER AGENT STATUS 308
1231	AIRLINE 1	E-ADDRESS#1	N
1232	AIRLINE 2	DBASEADDRESS#2	Y
1233	AIRLINE 3	E-ADDRESS#3	N
1234	AIRLINE 4	DBASEADDRESS#4	Y

300A
300B
300C
300D

FIG. 3

400

BUYER IDENTIFIER 404	FINANCIAL ACCOUNT IDENTIFIER 408	BUYER NAME 408	BUYER CONTACT INFORMATION 410
4567	1111-1111-1111-1111	JOE SMITH	SMITH@SP.COM
6789	2222-2222-2222-2222	SUE JOHNSON	JOHNSON@SCHOOL.EDU

402A
402B

FIG. 4

5/10

500

BUYER OFFER IDENTIFIER 504	BUYER IDENTIFIER 508	BUYER OFFER CONDITIONS 508	PRICE 510	SUBMISSION DATE/TIME 512	EXPIRATION DATE/TIME 514
1	4567	-NY - LA RT -LEAVE 1/15/98 -RETURN 1/19/98	\$200.00	1/1/98	1/14/98
2	4567	-NY - LA RT -LEAVE 1/10/98 -RETURN 1/19/98	\$400.00	1/1/98	1/9/98
3	6789	-ORL - SF RT -LEAVE 1/25/98 -RETURN 1/29/98	\$350.00	1/1/98	1/1/98

502A 502B 502C

FIG. 5

600 ↗

BUYER OFFER CHARACTERISTIC IDENTIFIER 603	BUYER OFFER CHARACTERISTICS 604	TERM SIMILARITY RANGE 605
001	SUBMISSION DATE	WITHIN 2 DAYS OF ORIGINAL OFFER DATES
002	PRICE	WITHIN \$50.00 OF ORIGINAL OFFER PRICE
003	BUYER IDENTIFIER	IDENTICAL BUYER IDENTIFIERS
004	PAYMENT IDENTIFIER	IDENTICAL PAYMENT IDENTIFIERS
005	ITINERARY	SAME CITY PAIRS

602A ↗
602B ↗
602C ↗
602D ↗
602E ↗

FIG. 6A

650

RULE IDENTIFIER 654	TERM SIMILARITY RANGE IDENTIFIERS 656
001	$602C \wedge 602B \wedge 602E$
002	$602D \wedge 602B \wedge 602E$
003	$(602C \vee 602D) \wedge (602E \wedge 602A)$
004	$(602C \vee 602D) \wedge 602B \wedge 602E$

652A
652B
652C
652D

FIG. 6B

8 / 10

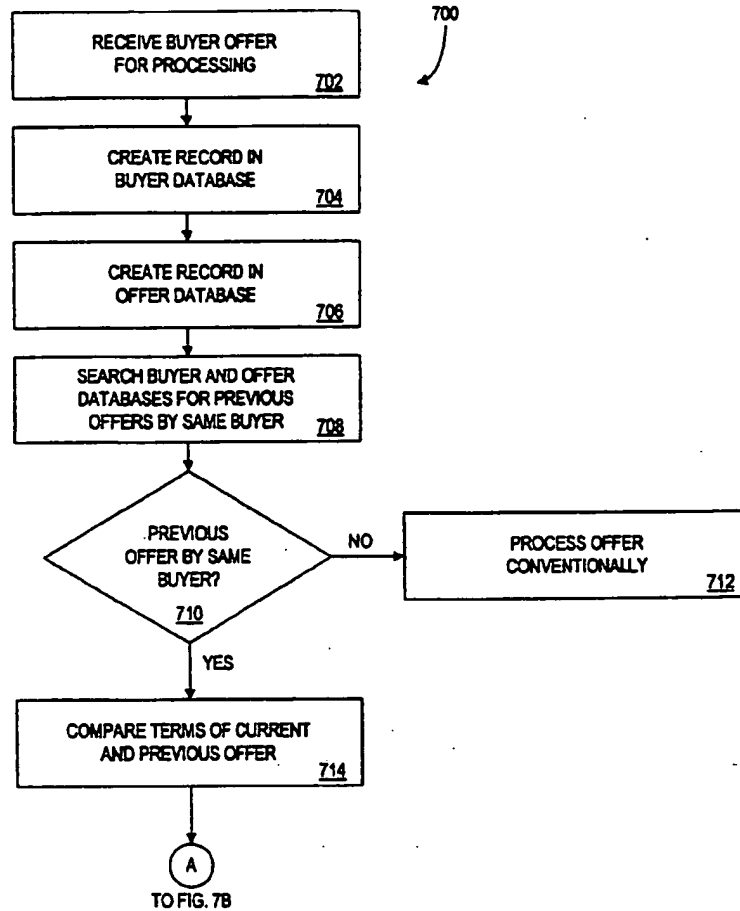


FIG. 7A

9/10

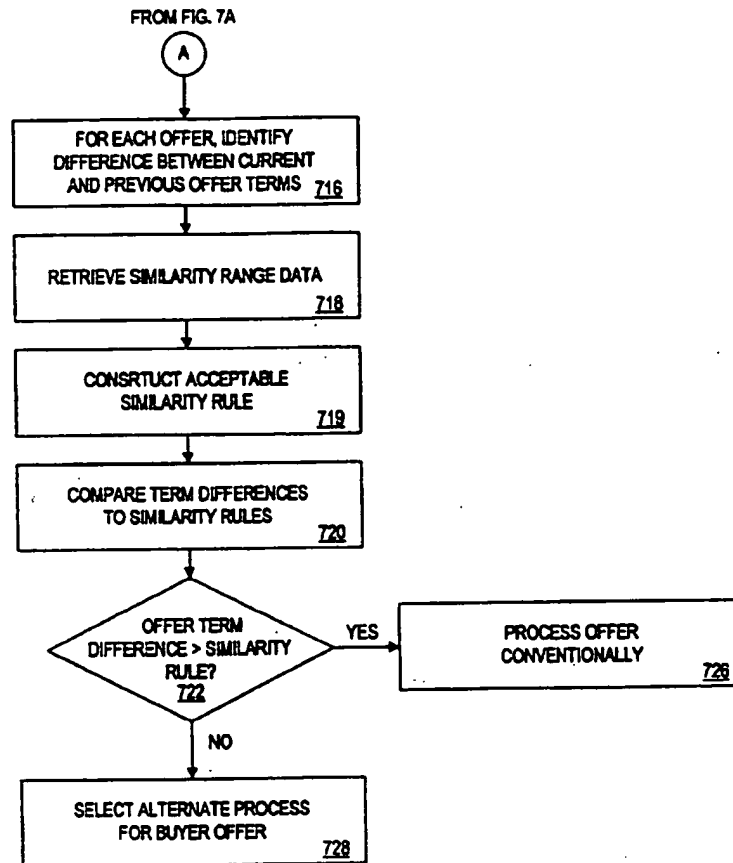


FIG. 7B

10 / 10

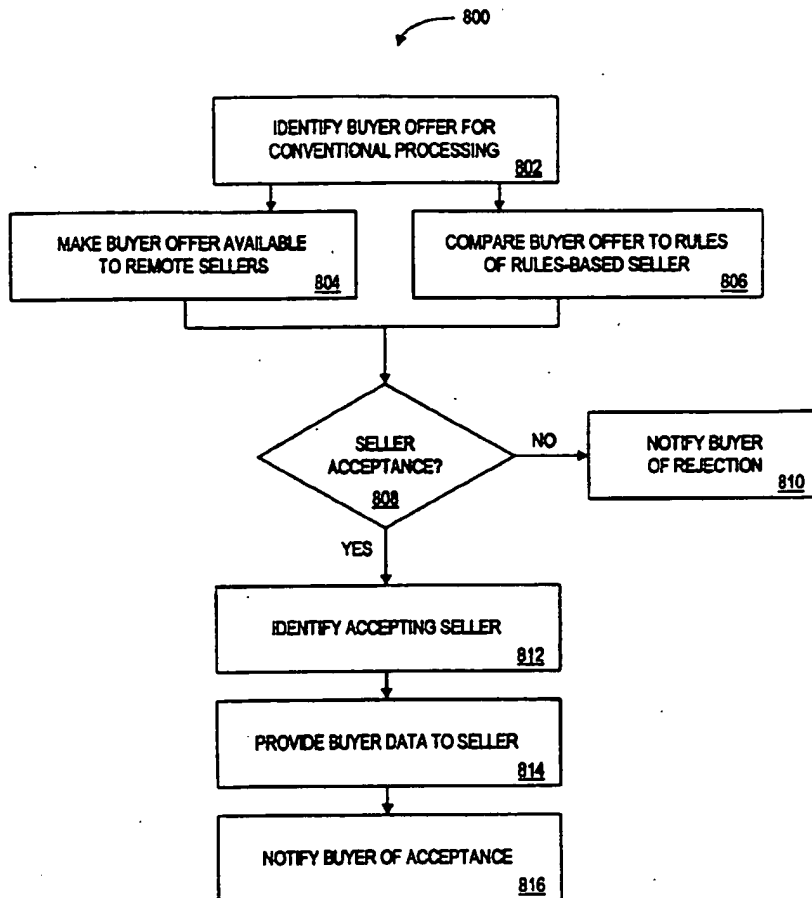


FIG. 8